generally accepted engineering practices and standards, that demonstrates that the requested station parameters will not produce a signal strength in excess of 39 dBu at any point along the edge of the requested service area. The coordinator may then recommend any ERP appropriate to meet this condition.

(3) An applicant for a station with a service area radius greater than 32 km (20 mi) must justify the requested service area radius, which may be authorized only in accordance with Table 2, note 4. Base stations with a service area radius greater than 80 km (50 mi) will be authorized only on a secondary basis.

Table 2 --- 450-470 MHz - Maximum ERP/Reference HAAT for a Specific Service Area Radius

Service area radius (km)	3	8	13	16	24	32	40[4]	48[4]	64[4]	80[4]
Maximum ERP (w) [1]	2	100	500[2]	500[2]	500[2]	500[2]	500[2]	500[2]	500[2]	500[2]
Up to reference HAAT (m)[3]	15	15	15	27	63	125	250	410	950	2700

[1] Maximum ERP indicated provides for a 39 dBu signal strength at the edge of the service area per FCC Report R-6602, Fig. 29 (See § 73.699, Fig. 10 b).

[2] Maximum ERP of 500 watts allowed. Signal strength at the service area contour may be less than 39 dBu.

[3] When the actual antenna HAAT is greater than the reference HAAT, the allowable ERP will be reduced in accordance with the following equation:
$ERP_{allow} = ERP_{max} \times (HAAT_{ref} / HAAT_{actual})^2$

[4] Applications for this service area radius may be granted upon specific request with justification and must include a technical demonstration that the signal strength at the edge of the service area does not exceed 39 dBu.

(h) 470-512 MHz. Power and height limitations are specified in §§ 90.307 and 90.309.

(j) 806-824/851-869 MHz and 896-901/935-940 MHz. Power and height limitations are specified in § 90.635.

(k) 902-928 MHz. LMS systems operating pursuant to Subpart M of this part in the 902-927.25 MHz band will be authorized a maximum of 30 watts ERP. LMS equipment operating in the 927.25-928 MHz band will be authorized a maximum of 300 watts ERP. ERP must be measured as peak envelope power. Antenna heights will be as specified in § 90.353(h).

(l) Above 928 MHz.

26. Section 90.207 is amended by replacing the introductory text, adding a new paragraph (a), redesignating existing paragraphs (a) through (l) as (b) through (m), and adding paragraph (n) to read as follows:

§ 90.207 Types of emissions.

Unless specified elsewhere in this part, stations will be authorized emissions as provided for in the following paragraphs. For a complete listing of emission symbols see § 2.201 of the Commissions's rules 47 C.F.R. § 2.201.

(a) Explanation of emission symbols.

The first symbol indicates the type of modulation on the transmitter carrier.

A - Amplitude modulation, double sideband with identical information on each sideband.
F - Frequency modulation
G - Phase modulation.
J - Single sideband with suppressed carrier.
P - Unmodulated pulse.

The second symbol indicates the type of signal modulating the transmitter carrier.

0 - No modulation.
1 - Digital modulation, no subcarrier.
2 - Digital modulation, modulated subcarrier.
3 - Analog modulation.

The third symbol indicates the type of transmitted information.

A - Telegraphy for aural reception.
B - Telegraphy for machine reception.
C - Facsimile
D - Data, telemetry, and telecommand.
E - Voice.
N - No transmitted information.

(b) - (m) * * *

(n) Other emissions. Requests for emissions other than those listed in paragraphs (c) through (e) of this section will be considered on a case-by-case basis to ensure that the requested emission will not cause more interference than other currently permitted emissions.

27. Section 90.209 is revised to read as follows:

§ 90.209 Bandwidth limitations.

(a) Each authorization issued to a station licensed under this part will show an emission designator representing the class of emission authorized. The designator will be prefixed by a specified necessary bandwidth. This number does not necessarily indicate the bandwidth occupied by the emission at any instant. In those cases where § 2.202 of Part 2 of this chapter does not provide a formula for the computation of necessary bandwidth, the occupied bandwidth, as defined in Part 2, may be used in lieu of the necessary bandwidth.

(b) The maximum authorized single channel bandwidth of emission corresponding to the type of emission specified in § 90.207 of this part is as follows:

(1) For A1A or A1B emissions, the maximum authorized bandwidth is 0.25 kHz. The maximum authorized bandwidth for type A3E emission is 8 kHz.

(2) For operations below 25 MHz utilizing J3E emission, the bandwidth occupied by the emission shall not exceed 3000 Hz. The assigned frequency will be specified in the authorization. The authorized carrier frequency will be 1400 Hz lower in frequency than the assigned frequency. Only upper sideband emission may be used. In the case of regularly available double sideband radiotelephone channels, an assigned frequency for J3E emissions is available either 1600 Hz below or 1400 Hz above the double sideband radiotelephone assigned frequency.

(3) For all other types of emissions, the maximum authorized bandwidth shall not be more than that normally authorized for voice operations

(4) Where a frequency is assigned exclusively to a single licensee, more than a single emission may be used within the authorized bandwidth. In such cases, the frequency stability requirements of § 90.213 must be met for each emission.

(5) Unless specified elsewhere, channel spacings and bandwidths that will be authorized in the following frequency bands are given in the following Table.

Standard Channel Spacing/Bandwidth

Frequency Band (MHz)	Channel Spacing (kHz)	Authorized Bandwidth (kHz)
Below 25 [2]	--	--
25 - 50	20	20
72 - 76	20	20
150 - 174	7.5 [1]	25/11.25/6 [1, 3]
220 - 222	5	4
421 - 512 [2]	6.25 [1]	25/11.25/6 [1, 3]
806 - 821/851 - 866	25	20
821 - 824/866 - 869	12.5	20
896 - 901/935 - 940	12.5	13.6
902-928 [4]	--	--
929 - 930	25	20
1427 - 1435 [2]	--	--

Frequency Band (MHz)	Channel Spacing (kHz)	Authorized Bandwidth (kHz)
2450 - 2483.5 [2]	--	--
Above 2500 [2]	--	--

[1] For stations authorized on or after August 16, 1995.

[2] Bandwidths for radiolocation stations in the 420-450 MHz band and for stations operating in bands subject to this footnote will be reviewed and authorized on a case-by-case basis.

[3] Operations using equipment designed to operate with a 25 kHz channel bandwidth will be authorized a 20 kHz bandwidth. Operations using equipment designed to operate with a 12.5 kHz channel bandwidth will be authorized a 11.25 kHz bandwidth. Operations using equipment designed to operate with a 6.25 kHz channel bandwidth will be authorized a 6 kHz bandwidth.

[4] The maximum authorized bandwidth shall be 12 MHz for non-multilateration LMS operations in the band 909.75-921.75 MHz and 2 MHz in the band 902.00-904.00 MHz. The maximum authorized bandwidth for multilateration LMS operations shall be 5.75 MHz in the 904.00-909.75 MHz band; 2 MHz in the 919.75-921.75 MHz band; 5.75 MHz in the 921.75-927.25 MHz band and its associated 927.25-927.50 MHz narrowband forward link; and 8.00 MHz if the 919.75-921.75 MHz and 921.75-927.25 MHz bands and their associated 927.25-927.50 MHz and 927.50-927.75 MHz narrowband forward links are aggregated.

* * * * *

28. Section 90.210 is added to read as follows:

§ 90.210 Emission masks.

(a) Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (l) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere, the Table below specifies the emission masks for equipment operating in the frequency bands governed under this part.

Applicable Emission Masks		
Frequency band (MHz)	Mask for equipment with audio low pass filter	Mask for equipment without audio low pass filter
Below 25 [1]	A or B	A or C
25-50	B	C
72-76	B	C
150-174 [2]	B, D, or E	C, D, or E
150 Paging-only	B	C
220-222	F	F
421-512 [2]	B, D, or E	C, D, or E
450 Paging-only	B	G
806-821/851-866	B	G
821-824/866-869	B	H
896-901/935-940	I	J
902-928	K	K
929-930	B	G
Above 940	B	C
All other bands	B	C

[1] Equipment using single sideband J3E emission must the requirements of Emission Mask A. Equipment using other emissions must meet the requirements of Emission Mask B or C, as applicable.

[2] Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed to operate with a 6.25 kHz channel bandwidth must meet the requirements of Emission Mask E.

(a) **Emission Mask A.** For transmitters utilizing J3E emission, the carrier must be at least 40 dB below the peak envelope power and the power of emissions must be reduced below the output power (P in watts) of the transmitter as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 150 percent of the authorized bandwidth: **At least 25 dB.**

(2) On any frequency removed from the assigned frequency by more than 150 percent, but not more than 250 percent of the authorized bandwidth: **At least 35 dB.**

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: **At least 43 + 10 log P dB.**

(b) **Emission Mask B.** For transmitters that are **equipped** with an audio low-pass filter pursuant to § 90.211(a), the power of any emission must be below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: **At least 25 dB.**

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: **At least 35 dB.**

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: **At least 43 + 10 log (P) dB.**

(c) **Emission Mask C.** For transmitters that are **not equipped** with an audio low-pass filter pursuant to § 90.211(b), the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz, but not more than 10 kHz: **At least 83 log (f_d/5) dB;**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: **At least 29 log (f_d^2/11) dB or 50 dB, whichever is the lesser attenuation;**

(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: **At least 43 + 10 log (P) dB.**

(d) **Emission Mask D - 12.5 kHz channel bandwidth equipment.** For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f_0 to 5.625 kHz removed from f_0: **Zero dB.**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: **At least 7.27(f_d- 2.88 kHz) dB.**

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz: **At least 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.**

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two to three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emissions mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth see paragraph (l) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, then an alternate procedure may be used provided prior Commission approval is obtained.

(e) **Emission Mask E - 6.25 kHz or less channel bandwidth equipment.** For transmitters designed to operate with a 6.25 kHz or less bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f_0 to 3.0 kHz removed from f_0: **Zero dB.**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 3.0 kHz but no more than 4.6 kHz: **At least 30 + 16.67(f_d - 3 kHz) or 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.**

(3) On any frequency removed from the center of the authorized bandwidth by more than 4.6 kHz: **At least 55 + 10 log (P) or 65 dB, whichever is the lesser attenuation.**

(4) The reference level for showing compliance with the emission mask shall be established using a resolution bandwidth sufficiently wide (usually two to three times the channel bandwidth) to capture the true peak emission of the equipment under test. In order to show compliance with the emissions mask up to and including 50 kHz removed from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For emissions beyond 50 kHz from the edge of the authorized bandwidth see paragraph (l) of this section. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, then an alternate procedure may be used

provided prior Commission approval is obtained.

(f) **Emission Mask F.** For transmitters operating in the 220-222 MHz frequency band, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:

(1) On any frequency from the center of the authorized bandwidth f_o to the edge of the authorized bandwidth f_c: **Zero dB.**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 2 kHz up to and including 3.75 kHz: **30 + 20(f_d -2) dB or 55 + 10 log (P), or 65 dB, whichever is the lesser attenuation.**

(3) On any frequency beyond 3.75 kHz removed from the center of the authorized bandwidth f_d: **At least 55 + 10 log (P) dB.**

(g) **Emission Mask G.** For transmitters that are **not equipped** with an audio low-pass filter pursuant to § 90.211(b), the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz, but no more than 10 kHz: **At least 83 log (f_d/5) dB;**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but no more than 250 percent of the authorized bandwidth: **At least 116 log (f_d/6.1) dB, or 50 + 10 log (P) dB, or 70 dB, whichever is the lesser attenuation;**

(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: **At least 43 + 10 log (P) dB.**

(h) **Emission Mask H.** For transmitters that are **not equipped** with an audio low-pass filter pursuant to § 90.211(b), the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of 4 kHz or less: **Zero dB.**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 4 kHz, but no more than 8.5 kHz: **At least 107 log (f_d/4) dB;**

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 8.5 kHz, but no more than 15 kHz: **At least 40.5 log (f_d/1.16) dB;**

(4) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 15 kHz, but no more than 25 kHz: **At least 116 log (f_d/6.1) dB;**

(5) On any frequency removed from the center of the authorized bandwidth by more than 25 kHz: **At least 43 + log (P) dB.**

(i) **Emission Mask I.** For transmitters that are equipped with an audio low pass filter pursuant to § 90.211(a), the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency of more than 6.8 kHz, but no more than 9.0 kHz: **At least 25 dB;**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency of more than 9.0 kHz, but no more than 15 kHz: **At least 35 dB;**

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency of more than 15 kHz: **At least 43 + 10 log (P) dB, or 70 dB, whichever is the lesser attenuation.**

(j) **Emission Mask J.** For transmitters that are **not equipped** with an audio low-pass filter pursuant to § 90.211(b), the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) as follows:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 2.5 kHz, but no more than 6.25 kHz: **At least 53 log (f_d/2.5) dB;**

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 6.25 kHz, but no more than 9.5 kHz: **At least 103 log (f_d/3.9) dB;**

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 9.5 kHz: **At least 157 log (f_d/5.3) dB, or 50 + 10 log (P) dB or 70 dB, whichever is the lesser attenuation.**

(k) **Emission Mask K.** For transmitters authorized under Subpart M that operate in the 902-928 MHz band, the peak power of any emission shall be attenuated below the power

of the highest emission contained within the licensee's LMS sub-band in accordance with the following schedule:

(1) On any frequency within the authorized bandwidth: **Zero dB.**

(2) On any frequency outside the licensee's LMS sub-band edges (as identified in paragraph (k)(5) of this section): **55 + 10 log(P) dB**, where (P) is the highest emission (watts) of the transmitter inside the licensee's LMS sub-band.

(3) The resolution bandwidth of the instrumentation used to measure the emission power shall be 100 kHz. If a video filter is used, its bandwidth shall not be less than the resolution bandwidth.

(4) Emission power (P) shall be measured in peak values.

(5) The LMS sub-band edges for multilateration systems for which emissions must be attenuated are 904.00, 909.75, 919.75, 921.75, 927.50, 927.75 and 928.00 MHz. If the 919.75-921.75 and 921.75-927.25 MHz sub-bands are aggregated by a single licensee, the emission mask limitations at the band edges at 921.75 and 927.50 MHz may be ignored. The LMS sub-band edges for non-multilateration systems for which emissions must be attenuated are 902.00, 904.00, 909.75 and 921.75 MHz.

(l) **Other frequency bands.** Transmitters designed for operation under this part on frequencies other than listed in this section must meet the emission mask requirements of Emission Mask B. Equipment operating under this part on frequencies allocated to but shared with the Federal Government, must meet the applicable Federal Government technical standards.

(m) **Instrumentation.** The reference level for showing compliance with the emission mask shall be established, except as indicated in Sections 90.210 (d), (e), and (k), using standard engineering practices for the modulation characteristic used by the equipment under test. For measuring emissions up to and including 50 kHz from the edge of the authorized bandwidth, adjust the resolution bandwidth to 100 Hz with the measuring instrument in a peak hold mode. A sufficient number of sweeps must be measured to insure that the emission profile is developed. If video filtering is used, its bandwidth must not be less than the instrument resolution bandwidth. For frequencies more than 50 kHz removed from the edge of the authorized bandwidth a resolution of at least 10 kHz must be used for frequencies below 1000 MHz. Above 1000 MHz the resolution bandwidth of the instrumentation must be at least 1 MHz. If it can be shown that use of the above instrumentation settings do not accurately represent the true interference potential of the equipment under test, then an alternate procedure may be used provided prior Commission approval is obtained.

29. Section 90.211 is revised to read as follows

§ 90.211 Modulation requirements.

Each transmitter must meet the requirements provided in paragraphs (a) or (b) of this section. The requirements of this paragraph do not apply to mobile stations that are authorized to operate with a maximum power output of 2 watts or less.

(a) Transmitters utilizing **analog emissions** that are equipped with an audio low-pass filter and must meet the emission limitations specified in § 90.210 under all possible conditions of operation.

(b) Transmitters utilizing **digital or analog emissions** without an audio low-pass filter must be tested for type acceptance using the digital or analog modulating signal or signals specified by the Part 2 of the rules. The type acceptance application must contain such information as may be necessary to demonstrate that the transmitter complies with the emission limitations specified in § 90.210.

30. Section 90.213 is revised to read as follows:

§ 90.213 Frequency stability.

(a) Unless noted elsewhere, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following Table.

Minimum Frequency Stability
parts per million (ppm)

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
Below 25	100 [1, 2, 3]	100	200
25 - 50	20	20	50
72 - 76	5	---	50
150 - 174	5 [5, 11]	5 [6]	5 [4, 6]
220 - 222	0.1	1.5	1.5
421 - 512	5 [7, 11]	5 [8]	5 [8]
806 - 821	1.5	2.5	2.5
821 - 824	1.0	1.5	1.5
851 - 866	1.5	2.5	2.5
866 - 869	1.0	1.5	1.5
896 - 901	0.1	1.5	1.5
902 - 928	2.5	2.5	2.5
929 - 930	1.5	---	---
935 - 940	0.1	1.5	1.5
1427 - 1435	300 [9]	300	300
Above 2450 [10]	---	---	---

[1] Fixed and base stations with over 200 watts transmitter power must have a frequency stability of 50 ppm except for equipment used in the Public Safety Radio Services where the frequency stability is 100 ppm.

[2] For single sideband operations below 25 MHz, the carrier frequency must be maintained within 50 Hz of the authorized carrier frequency.

[3] Travelers information station transmitters operating from 530-1700 kHz and transmitters exceeding 200 watts peak envelope power used for disaster communications and long distance circuit operations pursuant to §§ 90.242 and 90.264 must maintain the carrier frequency to within 20 Hz of the authorized frequency.

[4] Stations operating in the 154.45 to 154.49 MHz or the 173.2 to 173.4 MHz bands must have a frequency stability of 5 ppm.

[5] In the 150-174 MHz band, fixed and base stations with a 12.5 kHz channel bandwidth must have a frequency stability of 2.5 ppm. Fixed and base stations with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

[6] In the 150-174 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth or designed to operate on a frequency specifically designated for itinerant use or designed for low-power operation of two watts or less, must have a frequency stability of 5 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 1.0 ppm.

[7] In the 421-512 MHz band, fixed and base stations with a 12.5 kHz channel bandwidth must have a frequency stability of 1.5 ppm. Fixed and base stations with a 6.25 kHz channel bandwidth must have a frequency stability of 0.1 ppm.

[8] In the 421-512 MHz band, mobile stations designed to operate with a 12.5 kHz channel bandwidth or designed to operate on a frequency specifically designated for itinerant use or designed for low-power operation of two watts or less, must have a frequency stability of 2.5 ppm. Mobile stations designed to operate with a 6.25 kHz channel bandwidth must have a frequency stability of 0.5 ppm.

[9] Fixed stations with output powers above 120 watts and necessary bandwidth less than 3 kHz must operate with a frequency stability of 100 ppm. Fixed stations with output powers less than 120 watts and using time-division multiplex, must operate with a frequency stability of 500 ppm.

[10] Frequency stability to be specified in the station authorization.

[11] Paging transmitters operating on paging-only frequencies must operate with frequency stability of 5 ppm in the 150 -174 MHz band and 2.5 ppm in the 421-512 MHz band.

(b) For the purpose of determining the frequency stability limits, the power of a transmitter is considered to be the maximum rated output power as specified by the manufacturer.

31. Section 90.214 is added to read as follows:

§ 90.214 Transient Frequency Behavior.

In the 150-174 MHz and 421-512 MHz frequency bands, transient frequencies must be within the maximum frequency difference limits during the time intervals indicated:

Transient Frequency Behavior For Equipment Designed To Operate on 25 kHz Channels

Time Intervals [1,2]	Maximum Frequency Difference [3]	Frequency Ranges (MHz)					
		Base Stations and Portable Radios			Mobile Radios		
		150 to 174	450 to 500	500 to 512	150 to 174	450 to 500	500 to 512
t_1 [4]	± 25.0 kHz	5.0 ms	10.0 ms	20.0 ms	5.0 ms	10.0 ms	5.0 ms
t_2	± 12.5 kHz	20.0 ms	25.0 ms	50.0 ms	20.0 ms	25.0 ms	20.0 ms
t_3 [4]	± 25.0 kHz	5.0 ms	10.0 ms	10.0 ms	5.0 ms	10.0 ms	5.0 ms

Transient Frequency Behavior For Equipment Designed To Operate on 12.5 kHz Channels

Time Intervals [1,2]	Maximum Frequency Difference [3]	Frequency Ranges (MHz)		
		All Equipment		
		150 to 174	450 to 500	500 to 512
t_1 [4]	± 12.5 kHz	5.0 ms	10.0 ms	20.0 ms
t_2	± 6.25 kHz	20.0 ms	25.0 ms	50.0 ms
t_3 [4]	± 12.5 kHz	5.0 ms	10.0 ms	10.0 ms

Transient Frequency Behavior For Equipment Designed To Operate on 6.25 kHz Channels

Time Intervals [1,2]	Maximum Frequency Difference [3]	Frequency Ranges (MHz)		
		All Equipment		
		150 to 174	450 to 500	500 to 512
t_1 [4]	± 6.25 kHz	5.0 ms	10.0 ms	20.0 ms
t_2	± 3.125 kHz	20.0 ms	25.0 ms	50.0 ms
t_3 [4]	± 6.25 kHz	5.0 ms	10.0 ms	10.0 ms

[1] t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.
t_1 is the time period immediately following t_{on}.
t_2 is the time period immediately following t_1.
t_3 is the time period from the instant when the transmitter is turned off until t_{off}.
t_{off} is the instant when the 1 kHz test signal starts to rise.

[2] During the time from the end of t_2 to the beginning of t_3, the frequency difference must not exceed the limits specified in § 90.213.

[3] Difference between the actual transmitter frequency and the assigned transmitter frequency.

[4] If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

32. Section 90.217 is revised to read as follows:

§ 90.217 Exemption from technical standards.

(a) Except as noted herein, transmitters used at stations licensed in the Business Radio Service which have an output power not exceeding 120 milliwatts are exempt from the technical requirements set out in this subpart, but must instead comply with the following:

(b) For equipment designed to operate with a 20 kHz channel bandwidth, the sum of the bandwidth occupied by the emitted signal plus the bandwidth required for frequency stability shall be adjusted so that any emission appearing on a frequency 40 kHz or more removed from the assigned frequency is attenuated at least 30 dB below the unmodulated carrier.

(c) For equipment designed to operate with a 12.5 kHz channel bandwidth, the sum of the bandwidth occupied by the emitted signal plus the bandwidth required for frequency stability shall be adjusted so that any emission appearing on a frequency 25 kHz or more removed from the assigned frequency is attenuated at least 30 dB below the unmodulated carrier.

(d) For equipment designed to operate with a 6.25 kHz channel bandwidth, the sum of the bandwidth occupied by the emitted signal plus the bandwidth required for frequency stability shall be adjusted so that any emission appearing on a frequency 12.5 kHz or more removed from the assigned frequency is attenuated at least 30 dB below the unmodulated carrier.

(e) Transmitters may be operated in the continuous carrier transmit mode.

33. Section 90.238 is amended by revising paragraph (e) to read as follows:

§ 90.238 Telemetry operations.

* * * * *

(e) In the 450-470 MHz band, telemetry operations will be authorized on a secondary basis with a transmitter output power not to exceed 2 watts on frequencies subject to the limitations in the following paragraphs:

90.17 (c)(24)	90.63 (d)(24)	90.79 (d)(23)
90.19 (c)(26)	90.65 (c)(41)	90.81 (d)(11)
90.21 (c)(16)	90.67 (c)(36)	90.89 (c)(21)
90.23 (c)(18)	90.69 (c)(12)	90.91 (c)(18)
90.25 (c)(22)	90.71 (c)(12)	90.93 (c)(15)
90.27 (c)(2)	90.73 (d)(35)	90.95 (d)(18)
90.53 (b)(30)	90.75 (c)(24)	

* * * * *

34. Section 90.243 is amended by revising paragraph (b)(2) to read as follows:

§ 90.243 Mobile relay operation.

* * * * *

(b) * * *

(1) * * *

(2) In the Business Radio Service, mobile relay stations may be authorized on frequencies below 450 MHz when those frequencies are reserved for low-power operation of 2 watts or less. Such stations will be authorized a maximum output power not to exceed one watt and the mobile relay antenna system may not be more than 13 m (40 ft) above the ground.

* * * * *

35. Section 90.257 is amended by revising the introductory text in paragraph (b) to read as follows:

§ 90.257 Assignment and use of frequencies in the band 72-76 MHz.

* * * * *

(b) The following criteria governs the authorization and use of frequencies in the 72-76 MHz band by mobile stations in the Special Industrial, Manufacturers, Forest Products, Railroad, Power, Petroleum, and Business Radio Services.

* * * * *

36. Section 90.261 is amended by revising the list of frequencies in paragraph (f) to read as follows:

§ 90.261 Assignment and use of the frequencies in the band 450-470 MHz for fixed operations.

* * * * *

(f) Secondary fixed operations * * *

451.800/456.800
451.80625/456.80625
451.8125/456.8125
451.81875/456.81875

452.525
452.53125
452.5375
452.54375
452.550
452.55625
452.5625
452.56875
452.575
452.58125
452.5875
452.59375
452.600
452.60625
452.6125
452.61875

452.925/457.925
452.93125/457.93125
452.9375/457.9375
452.94375/457.94375
452.950/457.950
452.95625/457.95625
452.9625/457.9625
452.96875/457.96875

453.025/458.025
453.03125/458.03125
453.0375/458.0375
453.04375/458.04375
453.075/458.075
453.08125/458.08125
453.0875/458.0875
453.09375/458.09375
453.125/458.125
453.13125/458.13125
453.1375/458.1375
453.14375/458.14375
453.175/458.175

453.18125/458.18125
453.1875/458.1875
453.19375/458.19375

454.000/459.000
454.00625/459.00625
454.0125/459.0125
454.01875/459.01875

462.950/467.950
462.95625/467.95625
462.9625/467.9625
462.96875/467.96875
462.975/467.975
462.98125/467.98125
462.9875/467.9875
462.99375/467.99375
463.000/468.000
463.00625/468.00625
463.0125/468.0125
463.01875/468.01875
463.025/468.025
463.03125/468.03125
463.0375/468.0375
463.04375/468.04375
463.050/468.050
463.05625/468.05625
463.0625/468.0625
463.06875/468.06875
463.075/468.075
463.08125/468.08125
463.0875/468.0875
463.09375/468.09375
463.100/468.100
463.10625/468.10625
463.1125/468.1125
463.11875/468.11875
463.125/468.125
463.13125/468.13125
463.1375/468.1375
463.14375/468.14375
463.150/468.150
463.15625/468.15625
463.1625/468.1625
463.16875/468.16875
463.175/468.175
463.18125/468.18125
463.1875/468.1875
463.19375/468.19375

* * * * *

37. Section 90.267 is revised to read as follows:

§ 90.267 Assignment and use of frequencies in the 450-470 MHz band for low-power use.

(a) Any regularly assignable frequency in the 450-470 MHz band listed in the tables in Subparts B, C, D, and E, may be designated as a low-power channel in a defined geographic area by the frequency coordinator of the service in which the frequency is available. These channels are subject to the following conditions.

(1) For channels available in more than one radio service, concurrence for low-power designation must be obtained from coordinators of all such services.

(2) For channels available in more than one radio service, the frequency coordination requirements in § 90.175 apply in all such services.

(3) The maximum authorized bandwidth for these frequencies is 6 kHz.

(4) Stations are limited to 2 watts output power.

(5) Wide area operations will not be authorized. The area of normal day-to-day operations will be described in the application in terms of maximum distance from a geographical center (latitude and longitude).

(6) Each coordinator must maintain a list of all channels it designates for low-power use and the geographic areas where such channels are available.

(i) The coordinator must make this list available to the public upon request.

(b) Frequencies separated by 3.125 kHz from regularly assignable frequencies in the 450-470 MHz band listed in the Tables in subparts B, C, D, and E, may be assigned in accordance with the following conditions:

(1) All stations will be licensed as mobiles but may serve the functions of base, fixed, or mobile relay stations. Stations are limited to 2 watts output power.

(2) All operations will be on a secondary basis to the primary operations (3.125 kHz removed) and shall be entitled to no protection from primary stations.

(3) The frequency coordination requirements in § 90.175 apply for all channels available under this section. For channels which are between primary channels available to more than one service of this section, the frequency coordination requirements in § 90.175

apply in all such services.

(4) Wide area operations will not be authorized. The area of normal day-to-day operations will be described in the application in terms of maximum distance from a geographical center (latitude and longitude).

(5) Applicants for stations under this section must specify base, mobile, or fixed operation, but are otherwise exempt from any limitation on the number of frequencies assignable contained elsewhere in Part 90.

(6) Antennas of mobile stations used as fixed stations communicating with one or more associated stations located within 45 degrees of azimuth shall be directional and have a front to back ratio of at least 15 dB. Except as provided below, the height of the antenna used at any mobile station serving as a base, fixed or mobile relay station may not exceed 7 m. (20 ft) above the ground level.

(i) No limit shall be placed on the length or height above ground level of any commercially manufactured radiating transmission line when the transmission line is terminated in a non-radiating load and is routed at least 7 m. (20 ft) interior to the edge of any structure or is routed below ground level.

(ii) Only sea-based stations, and central alarm stations operating on frequencies allocated for central station protection operations, may utilize antennas mounted not more than 7 m. (20 ft.) above a man-made supporting structure, including antenna structures.

(7) A hospital or health care institution holding a license to operate a radio station under this part may operate a medical radio telemetry device with an output power not to exceed 20 milliwatts without specific authorization from the Commission. All licensees operating under this authority must comply with the requirements and limitations set forth in this section.

(8) No assignment will be made on a frequency immediately adjacent to non-private radio service allocations.

(9) Frequencies from 462.7375 MHz to 462.9375 MHz and 464.9875 MHz to 465.0125 MHz are not available for authorization.

(10) Frequencies from 460.900 MHz to 461.01875 MHz and 465.900 MHz to 466.01875 MHz are available only for listed central station protection services and subject to § 90.75(c)(27) and (41).

38. Section 90.271 is deleted.

39. Section 90.273 is amended by revising paragraph (a) to read as follows:

§ 90.273 Availability and use of frequencies in the 421-430 MHz band.

* * * * *

(a) The following tables list frequencies available for assignment in the public safety, business or industrial/land transportation pools as indicated. In the tables, the public safety pool is denoted as "PS", the business pool as "B", and the industrial/land transportation pool as "I/LT." The frequencies 422.19375 MHz through 424.99375 MHz are paired with frequencies 427.19375 MHz through 429.99375 MHz, respectively. Only the lower half of each frequency pair, available for base station operation, is listed in the tables. Corresponding mobile and control station frequencies are 5 MHz higher than the base station frequency. The frequencies 425.000 through 425.48125 are unpaired and are available for either single frequency dispatch or paging operations.

Table 1 - Channels Available in Detroit and Cleveland Areas Only

Frequency (MHz)	Pool in which assigned
Paired channels:	
422.19375*	I/LT
422.200	I/LT
422.20625*	I/LT
422.21250	I/LT
422.21875*	I/LT
422.225	I/LT
422.23125*	I/LT
422.23750	I/LT
422.24375*	I/LT
422.250	I/LT
422.25625*	I/LT
422.26250	I/LT
422.26875*	I/LT
422.275	I/LT
422.28125*	I/LT
422.28750	I/LT
422.29375*	I/LT
422.300	I/LT
422.30625*	I/LT
422.31250	I/LT
422.31875*	I/LT
422.325	I/LT
422.33125*	I/LT
422.33750	I/LT
422.34375*	I/LT
422.350	I/LT
422.35625*	I/LT
422.36250	I/LT
422.36875*	I/LT
422.375	I/LT
422.38125*	I/LT
422.38750	I/LT
422.39375*	I/LT
422.400	I/LT
422.40625*	I/LT
422.41250	I/LT
422.41875*	I/LT
422.425	I/LT
422.43125*	I/LT
422.43750	I/LT
422.44375*	I/LT
422.450	I/LT
422.45625*	I/LT
422.46250	I/LT
422.46875*	I/LT
422.475	I/LT
422.48125*	I/LT
422.48750	I/LT
422.49375*	I/LT
422.500	I/LT
422.50625*	I/LT
422.51250	I/LT
422.51875*	I/LT
422.525	I/LT
422.53125*	I/LT
422.53750	I/LT
422.54375*	I/LT
422.550	I/LT
422.55625*	I/LT
422.56250	I/LT
422.56875*	I/LT
422.575	I/LT
422.58125*	I/LT
422.58750	I/LT
422.59375*	I/LT
422.600	B
422.60625*	B

Frequency (MHz)	Pool in which assigned
422.61250	B
422.61875*	B
422.625	B
422.63125*	B
422.63750	B
422.64375*	B
422.650	B
422.65625*	B
422.66250	B
422.66875*	B
422.675	B
422.68125*	B
422.68750	B
422.69375*	B
422.700	B
422.70625*	B
422.71250	B
422.71875*	B
422.725	B
422.73125*	B
422.73750	B
422.74375*	B
422.750	B
422.75625*	B
422.76250	B
422.76875*	B
422.775	B
422.78125*	B
422.78750	B
422.79375*	B
422.800	B
422.80625*	B
422.81250	B
422.81875*	B
422.825	B
422.83125*	B
422.83750	B
422.84375*	B
422.850	B
422.85625*	B
422.86250	B
422.86875*	B
422.875	B
422.88125*	B
422.88750	B
422.89375*	B
422.900	B
422.90625*	B
422.91250	B
422.91875*	B
422.925	B
422.93125*	B
422.93750	B
422.94375*	B
422.950	B
422.95625*	B
422.96250	B
422.96875*	B
422.975	B

Frequency (MHz)	Pool in which assigned
422.98125*	B
422.98750	B
422.99375*	B
423.000	PS
423.00625*	PS
423.01250	PS
423.01875*	PS
423.025	PS
423.03125*	PS
423.03750	PS
423.04375*	PS
423.050	PS
423.05625*	PS
423.06250	PS
423.06875*	PS
423.075	PS
423.08125*	PS
423.08750	PS
423.09375*	PS
423.100	PS
423.10625*	PS
423.11250	PS
423.11875*	PS
423.125	PS
423.13125*	PS
423.13750	PS
423.14375*	PS
423.150	PS
423.15625*	PS
423.16250	PS
423.16875*	PS
423.175	PS
423.18125*	PS
423.18750	PS
423.19375*	PS
423.200	PS
423.20625*	PS
423.21250	PS
423.21875*	PS
423.225	PS
423.23125*	PS
423.23750	PS
423.24375*	PS
423.250	PS
423.25625*	PS
423.26250	PS
423.26875*	PS
423.275	PS
423.28125*	PS
423.28750	PS
423.29375*	PS
423.300	PS
423.30625*	PS
423.31250	PS
423.31875*	PS
423.325	PS
423.33125*	PS
423.33750	PS
423.34375*	PS

Frequency (MHz)	Pool in which assigned
423.350	PS
423.35625*	PS
423.36250	PS
423.36875*	PS
423.375	PS
423.38125*	PS
423.38750	PS
423.39375*	PS
423.400	PS
423.40625*	PS
423.41250	PS
423.41875*	PS
423.425	PS
423.43125*	PS
423.43750	PS
423.44375*	PS
423.450	PS
423.45625*	PS
423.46250	PS
423.46875*	PS
423.475	PS
423.48125*	PS
423.48750	PS
423.49375*	PS
423.500	PS
423.50625*	PS
423.51250	PS
423.51875*	PS
423.525	PS
423.53125*	PS
423.53750	PS
423.54375*	PS
423.550	PS
423.55625*	PS
423.56250	PS
423.56875*	PS
423.575	PS
423.58125*	PS
423.58750	PS
423.59375*	PS
423.600	PS
423.60625*	PS
423.61250	PS
423.61875*	PS
423.625	PS
423.63125*	PS
423.63750	PS
423.64375*	PS
423.650	PS
423.65625*	PS
423.66250	PS
423.66875*	PS
423.675	PS
423.68125*	PS
423.68750	PS
423.69375*	PS
423.700	PS
423.70625*	PS
423.71250	PS
423.71875*	PS
423.725	PS
423.73125*	PS
423.73750	PS
423.74375*	PS
423.750	PS
423.75625*	PS
423.76250	PS
423.76875*	PS
423.775	PS
423.78125*	PS
423.78750	PS
423.79375*	PS
423.800	PS
423.80625*	PS

* This frequency is not available until August 16, 1996. After August 16, 1996 this frequency will be assigned with an authorized bandwidth not to exceed 6 kHz.

Table 2 - Channels Available in Buffalo, Detroit and Cleveland Areas

Frequency (MHz)	Pool in which assigned
Paired channels:	
423.81875*	PS
423.825	PS
423.83125*	PS
423.83750	PS
423.84375*	PS
423.850	PS
423.85625*	PS
423.86250	PS
423.86875*	PS
423.875	PS
423.88125*	PS
423.88750	PS
423.89375*	PS
423.900	PS
423.90625*	PS
423.91250	PS
423.91875*	PS
423.925	PS
423.93125*	PS
423.93750	PS
423.94375*	PS
423.950	PS
423.95625*	PS
423.96250	PS
423.96875*	PS
423.975	PS
423.98125*	PS
423.98750	PS
423.99375*	PS
424.000	PS
424.00625*	PS
424.01250	PS